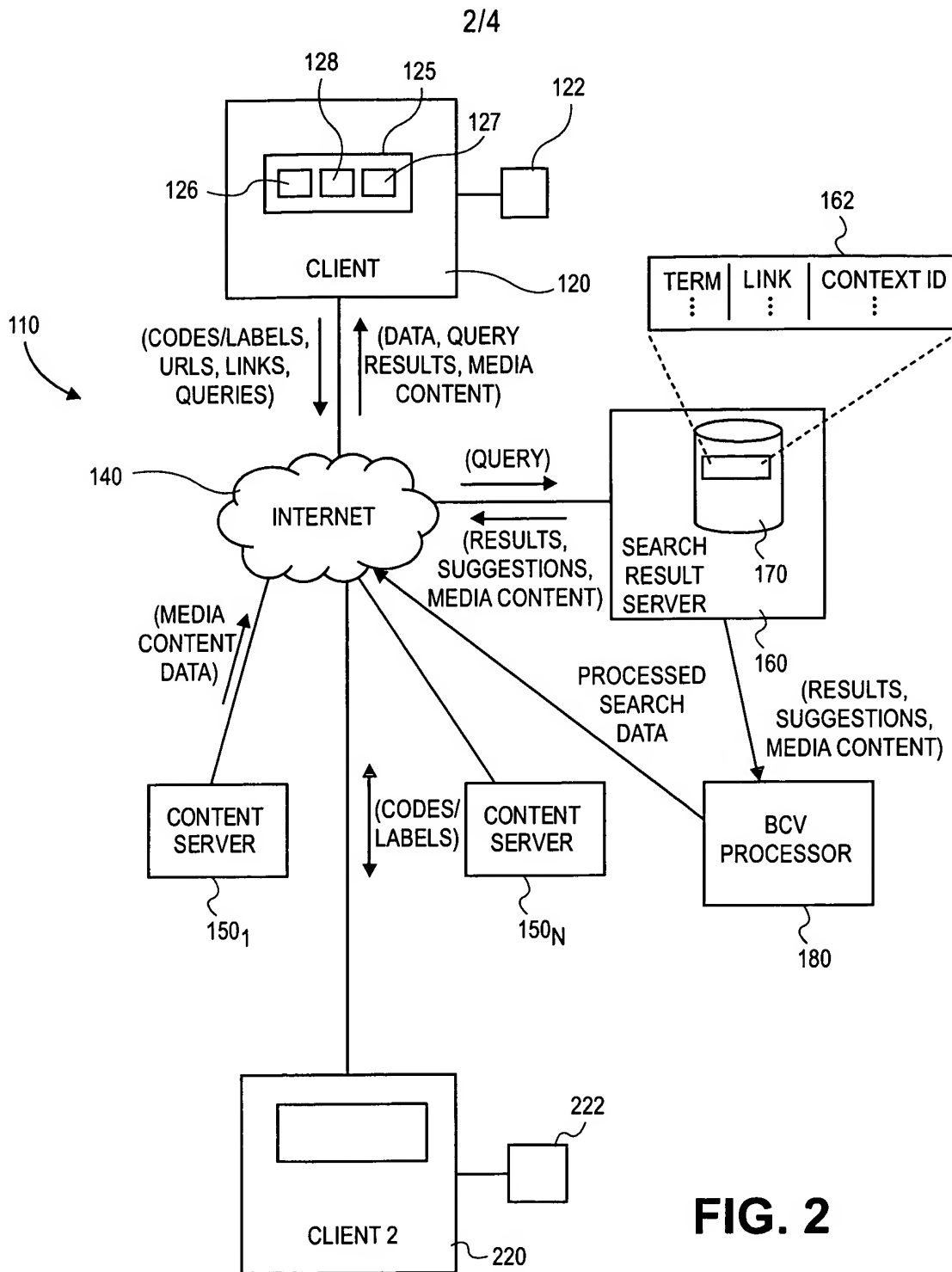


FIG. 1



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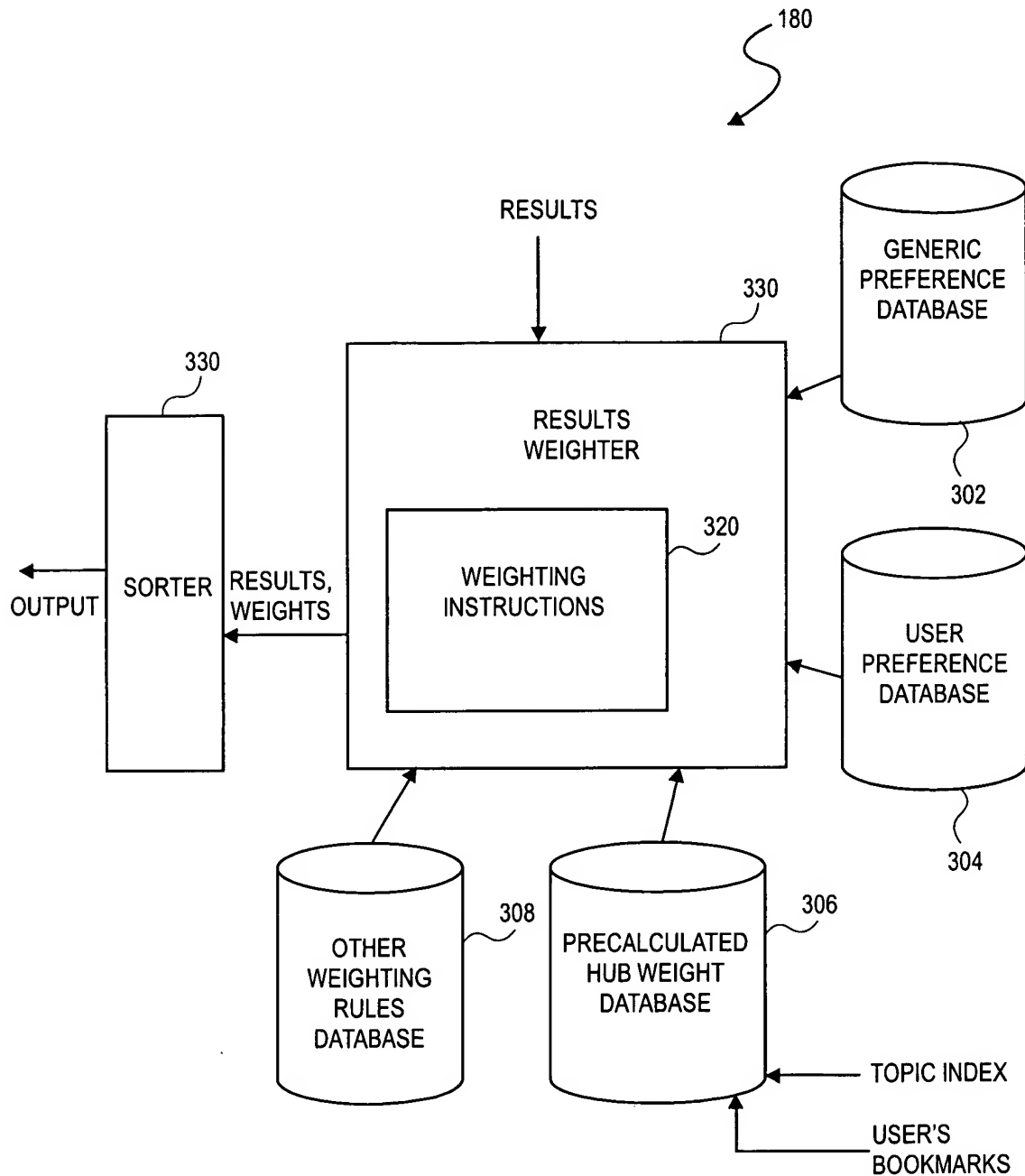


FIG. 3

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$p = \text{BCP}(b, w, \alpha)$ Bookmark-Coloring Process
Input: A bookmark b , a promotional amount w , a retention coefficient α .
Output: BCV p .
 $p = 0$
 $p_b += \alpha \cdot w$
if (*stopping criterion is met*) stop
for all links $b \rightarrow j$ in L
 $p = p + \text{BCP}(j, (1 - \alpha) \cdot w / \text{deg}(b), \alpha)$
end for

FIG. 4

$p = \text{BCP}(b, \alpha, e)$ Bookmark-Coloring Process
Input: A bookmark b , a retention coefficient α , and a tolerance threshold e .
Output: BCV p .
Initialize Q as a single pair queue $\{(b, 1)\}$
 $p = 0$
while (Q is not empty)
pop a queue Q element (i, w)
 $p_i += \alpha \cdot w$ // retained portion
if ($w < e$) // stopping criterion
continue // to beginning of while-loop
 $z = (1 - \alpha) \cdot w / \text{deg}(i)$ // distributed amount
for all links $i \rightarrow j$ in L // i is fixed: direct link access
if (pair (j, s) is present in Q) // direct Q access
 $s += z$ // existent element update
else // no j element in the queue
add a new pair (j, z) to Q // new queue element
end for
end while

FIG. 5

$[v, s] = \text{BC}(b, w, \alpha | H)$ H-Relative Conceptual Bookmark-Coloring Process
Input: A bookmark $b \notin H$, an amount w , a coefficient, and a hub H .
Output: H -relative BCV v and blocked s .
 $v = 0, s = 0$
if ($b \in H$)
 $s_b += w$
else
 $p_b += \alpha \cdot w$
if (*stopping criterion is met*) stop
for all links $b \rightarrow j$ in L
 $[v, s] = [v, s] + \text{BCP}(j, (1 - \alpha) \cdot w / \text{deg}(b), \alpha | H)$
end for
end else

FIG. 6